Global Dynamic Operations

Allocation of Remotely Piloted Aircraft among Combatant Commands

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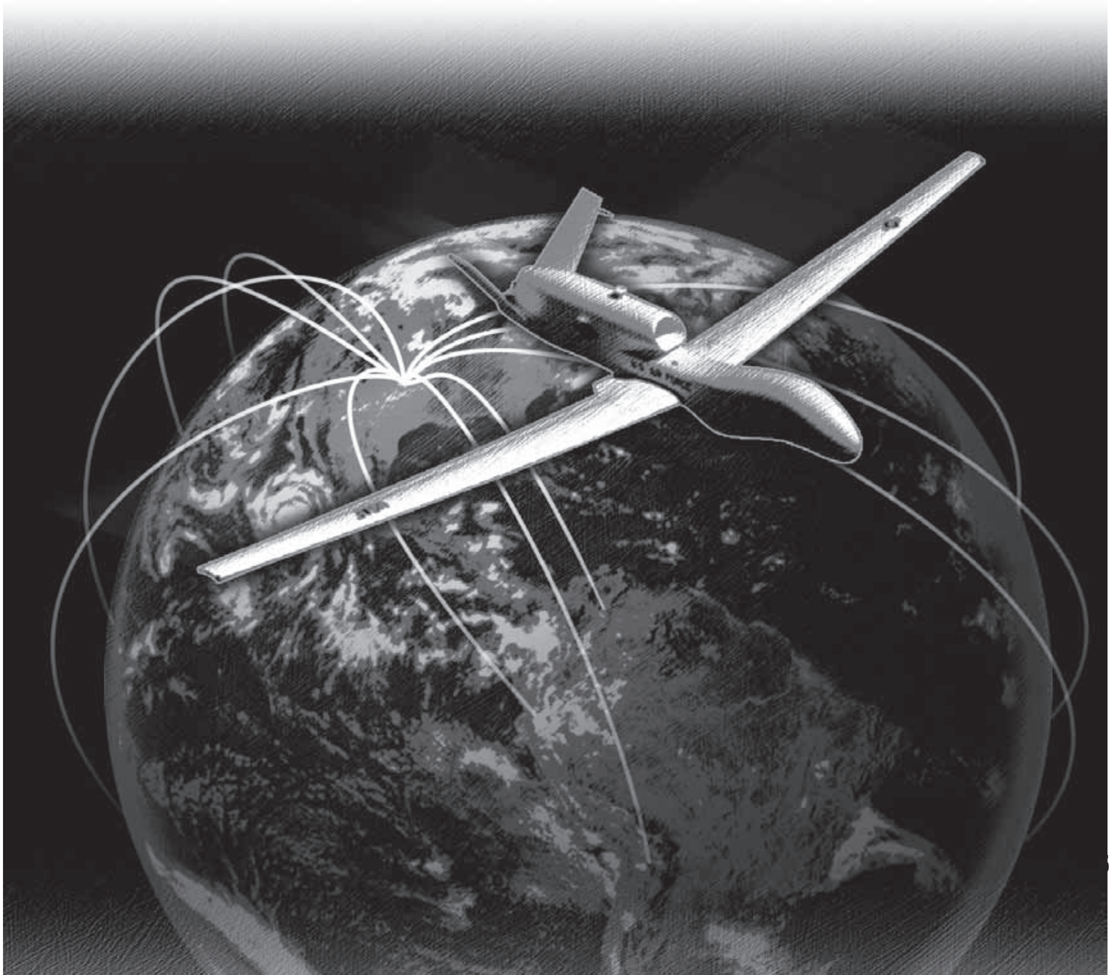
The range of military aviation is being extended so rapidly that the Atlantic will be cancelled out as a genuine obstacle within two years, the Pacific within three years. After that, in five years at the outside, the ultimate round-the-world range of 25,000 miles becomes inevitable. At that point, any nation will be able to hurl its aerial might against any spot on the face of the globe without intermediary bases. By the same token every country will be subject to assault from any direction anywhere in the world. The blows will be delivered from home bases, regardless of distance, with all oceans and bases in between turned into a no man's land.

—Alexander P. de Seversky
Victory through Air Power, 1942



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The Potential and the Problem

One of the most valuable attributes of airpower is its flexibility—the inherent ability to project power dynamically across large swaths of an operational area. Airpower's capability to operate in three dimensions, coupled with increased platform speed and range, enables commanders to reallocate airpower over great distances. Flexibility is exponentially enhanced when applied within a command and control (C2) construct involving remotely piloted aircraft (RPA) flying remote split operations (RSO).[1] Such remotely piloted RSO missions provide a unique capability unlike any other in history—the ability to "virtually" move RPA aircrews between aircraft and across the globe in minutes. In this sense, these aircrews are a resource that the US military can assign, apportion, and allocate in a manner similar to its handling of traditional forces and capabilities.

US Central Command (CENTCOM) has executed RSO allocation of theater-based, virtual RPAs since 2003—specifically, in Operations Enduring Freedom and Iraqi Freedom.[2] In these operations, an aircrew controlling an RPA in either Afghanistan or Iraq terminates control of that platform and establishes data-link control with another such aircraft in the other theater of operation. The entire transfer process can be completed in minutes. This capability enables CENTCOM to flex RPA aircrews among multiple theaters in response to dynamic and changing mission requirements.[3] This resource-allocation model provides a microcosm of the possibilities for employing RPA aircrews at the operational and strategic levels.

The next evolutionary step calls for allocating virtual RPA aircrews on a global scale, executed among combatant commands (COCOM). Although CENTCOM currently contains the preponderance of remotely piloted RSO aircraft operations (and, hence, the requisite associated maintenance and bandwidth), all other geographic COCOMs seek to employ these resources when available. A future scenario is quickly approaching in which all geographic COCOMs can execute remotely piloted RSO aircraft operations—a capability that will require a global mission-management construct to employ the global RPA enterprise effectively.

Maintaining such a construct for remotely piloted RSO aircraft operations has the strategic value of providing national decision makers a mechanism to dynamically translate changing strategic priorities into forces and capabilities. According to Joint Publication 3-0, *Joint Operations*,

> The SecDef [secretary of defense], with assistance from the CJCS [chairman of the Joint Chiefs of Staff], determines where the US military should be focused and where the nation can afford to accept risk. Continually assessing the relative importance of the various theater operations remains imperative. Integrated planning, coordination, and guidance among the Joint Staff, combatant commanders (CCDRs), and OGAs [other government agencies] ensures that changing strategic priorities are appropriately translated into clear planning guidance and adequate forces and their associated capabilities for CCDRs.[4]

Furthermore, dynamic allocation of RPA aircrews maximizes resources, enabling them to better respond to changing mission requirements among multiple COCOMs. This allocation construct can help achieve a degree of global strike and global, persistent surveillance capability as a form of power projection due to its ability to reallocate resources, irrespective of space.[5] The *Quadrennial Defense Review Report* of 2006 emphasizes power projection as critical to providing leadership with a broader range of military options in response to twenty-first-century security threats.[6] A problem does exist, however.

Specifically, although the technology for remotely piloted RSO aircraft affords the potential to achieve a level of power projection, we currently do not have either an organization or a construct to take advantage of these capabilities. As a process, Global Force Management (GFM) allows leaders to create capabilities that operational com-

manders need to implement the national defense strategy. Force management "seeks to integrate new and existing human and technical assets from across the Joint Force and its mission partners to make the right capabilities available at the right time and place."[7] However, current GFM organizational structures, policies, and processes involved in global force allocation are not designed (nor were they ever envisioned) to conduct *dynamic* inter-COCOM allocation. Furthermore, current GFM organizational command structures, policies, and procedures are highly centralized and bureaucratic, thereby inhibiting the speed with which remotely piloted RSO aircraft can be dynamically reallocated across the COCOM's geographic boundaries. Finally, policy and processes are organized along static and artificial COCOM boundaries that hinder dynamic inter-COCOM resource allocation of remotely piloted RSO aircraft.

This article uses *global dynamic operations* (GDO), a unique, nondoctrinal term to describe a futuristic concept of conducting dynamic allocation of RPA aircrews in a global distributed operations architecture, focusing on reallocation of aircrews, not platforms.[8] For our purposes, the proposed GDO concept encompasses organizational, policy, and process initiatives. In order to maximize the current and future capabilities of remotely piloted RSO aircraft, we must develop complementary command structures, policies, and processes.

Global Force Management Allocation

GFM seeks to align force assignment, apportionment, and allocation methodologies in support of national defense strategy, joint force availability requirements, and joint force assessments. All functions of GFM affect the GDO concept, but GFM allocation most directly and significantly affects GDO because resources are employed and transferred among COCOMs within this function. Inherent to GFM allocation is the role of Joint Forces Command, designated as the primary joint force provider for conventional forces, including remotely piloted RSO aircraft resources. That command uses guidance developed and approved by the Global Force Management Board to recommend global sourcing solutions to the chairman of the Joint Chiefs of Staff and the secretary of defense, who is the final authority in the GFM allocation process.

Attributes

The GFM allocation process consists of two methods—rotational force allocation in support of the COCOM's annual force needs and emergent force allocation in support of the COCOM's emerging or crisis-based requests. An eight-step process, emergent allocation focuses on satisfying requests for forces (RFF) or capabilities (RFC) within a 120-day timeline. To initiate the emergent allocation process, COCOMs submit an RFF/RFC to the Joint Staff, which validates these requirements and assigns them to a joint force provider. As the joint force provider for conventional forces, Joint Forces Command evaluates alternative sourcing solutions and generates a recommendation to the chairman of the Joint Chiefs of Staff and secretary of defense. Resources are allocated upon the secretary's approval. When the RFF/RFC process is not practical due to time considerations, policy permits the use of a voice order of the commanding officer (VOCO) to allocate forces.

Decisions concerning both rotational force and emergent force allocation are driven by established national priorities, as stated in the guidance of employment of forces (GEF), whose priorities are based on the mission. Prioritization is important in a resource-constrained environment. As a primary resource used for intelligence, surveillance, and reconnaissance (ISR) operations, RPAs are a well-recognized low-density, high-demand (LD/HD) asset. The US Air Force's concept of operations for theater ISR notes that "because ISR is conducted by low-density, high-demand . . . assets and

personnel, it is one of the few military operations that must prioritize among multiple plans and strategies both globally and within a theater."[9] Priority-based allocation is a critical requirement for LD/HD RPA assets.

Despite recognition of the need for priority-based allocation, GFM emergent allocation does not blindly follow a static priority list when allocating RPA resources. GFM subject-matter experts attempt to bring both art and science to the allocation process, applying art through creative problem solving as a means of seeking synergies among capabilities in order to provide more effective RPA operations. A plan may be designed in a manner that allocates resources to a lower-priority requirement. Consider the following example: Priorities dictate that COCOM X be routinely allocated a high percentage of RPA resources. COCOM Y has few RPAs allocated; however, reallocating resources from X to Y will disproportionately increase the percentage of capability in Y but only slightly decrease X's capability. In such a situation, the allocation will be discussed.

Memoranda of understanding/agreement (MOU/MOA) between combatant commanders offer another mechanism for reallocating resources among COCOMs. They typically come into play when a combatant commander needs a resource for a specific event and/or time; however, MOUs/MOAs can also cover routine/reoccurring missions. If combatant commanders cannot reach amicable terms, the secretary of defense can override/direct allocation, as necessary.

Deficiencies

The organizational structure, policy, and processes of current GFM emergent allocation do not satisfy the global, dynamic requirements for the allocation of RPA aircrews. From an organizational perspective, the VOCO position (designed to handle a limited number of dynamic, time-sensitive allocation requests on a nonroutine basis) is inadequate for handling the potentially high volume of requests that the GDO concept would generate. Ad hoc, time-sensitive requests are viewed as the exception, not the norm. Conversely, GDO will make time-critical reallocation requests the norm, not the exception.

Regarding policy, use of the VOCO is the most responsive allocation model offered by GFM at present. The VOCO has delegated authority to execute all functions of the eight-step emergent allocation process. However, the VOCO should be used only when time limitations make the standard process impractical. Granted, this policy adequately supports rotational force-allocation requirements, but it fails to acknowledge the frequency and tempo inherent in the execution of some GDO constructs. Furthermore, the current policy process is overcentralized—an untenable situation, given the volume of dynamic allocations possible through a GDO construct.

The MOU/MOA policy is also unrealistic in a GDO construct. That policy works best when conducted between no more than two COCOMs for preplanned missions in order to limit the level of complexity. GDO, however, is an inherently complex construct in that it supports multiple COCOMs simultaneously and on a continuous basis against ad hoc, unplanned tasking. Thus, applying the MOU/MOA policy approach for a GDO concept is unworkable. GFM policies must be developed that give a global mission-management entity the responsibility and authority to execute a GDO concept based on the GEF's priority. Complementary to this change is the need to alter the way priorities are communicated.

The GEF must articulate its priorities more clearly, with the mission and intent better defined in order to support the dynamic allocation of RSO RPAs. Current priorities are too broadly defined and do not provide mission managers the level of fidelity needed to conduct dynamic allocation between competing requirements. For instance, if counterterrorism is a high-priority mission maintained by multiple COCOMs, then the GEF's priorities must adequately communicate mission and intent, enabling global mission managers to exercise profes-

sional judgment in deciding which COCOM has the higher-priority counterterrorism mission. This level of fidelity is not required under traditional GFM allocation policy because manned assets are not responsive enough to force a dynamic allocation decision. However, due to the flexibility offered by a GDO concept, COCOMs will likely seek opportunities for RPAs to execute their high-priority targets. Therefore, clearly articulated priorities with mission and intent give the necessary guidance to exercise priority-based allocation in a dynamic, global environment.

The organizational structure, policy, and processes of GFM emergent force allocation fail to satisfy GDO concept requirements. Air Force–distributed intelligence and global air mobility operations—two well-established mission areas—deal with global force allocation. The Air Force's Distributed Common Ground System (DCGS) enterprise conducts global distributed intelligence operations routinely, similar to those conducted according to the GDO concept, and Eighteenth Air Force's tanker airlift control center (TACC) executes intertheater reallocation decisions of global air mobility forces. Some aspects of these two entities may translate to a GDO concept.

Air Force Distributed Common Ground System

As the Air Force's primary intelligence planning, collecting, processing, analysis, and dissemination system, the DCGS is a network-centric, global enterprise comprised of multiple distributed ground system sites operating worldwide.[10] Just as the GDO concept seeks to dynamically allocate RPA aircrews among COCOMs in support of national tasking, so does the Air Force DCGS execute dynamic allocation of intelligence processing, exploitation, and dissemination (PED) resources among COCOMs in support of national tasking. The complexities involved in the Air Force's DCGS distributed operations require robust, global mission management—a function carried out by the service's DCGS wing operation center (WOC).[11]

As the nerve center for executing C2 and mission management of the Air Force's DCGS global PED, the WOC is responsible for reconciling tasking and guidance with PED capacity resident throughout the worldwide Air Force DCGS enterprise. The WOC not only conducts preplanned allocation but also, during execution, dynamically allocates PED across the Air Force DCGS enterprise. In making allocation decisions, the WOC assesses mission impact, identifies idle capacity, reconfigures network systems (if required), monitors maintenance status, and identifies "fix" actions. In 2007 it reallocated 20 percent of tasked sorties, based on changing requirements, node capacities, and/or network issues.[12]

Maintaining adequate situational awareness and target knowledge for the tasked area of operation represents one of the challenges of conducting global distributed operations. The Air Force realizes tremendous efficiencies by using all of its available worldwide DCGS resources. However, analysts face significant obstacles in maintaining proficiency across the numerous disparate and unrelated environments from which targets emerge. To help mitigate this operational reality, the Air Force DCGS has structured itself along "focus areas." Identifying the core Air Force distributed ground system site as the "subject-matter expert" for each particular area helps build resident target depth while leveraging the Air Force DCGS enterprise as a whole.

Even though the WOC has responsibility for global mission management of the Air Force's DCGS PED, it does not maintain operational control (OPCON) of the respective distributed ground system sites that comprise the enterprise.[13] Rather, these sites remain under OPCON of their respective geographic COCOMs.[14] This break in C2 authority complicates the WOC's ability to execute its global mission-management functions. Efforts to establish a joint task force for global management of PED in or-

der to provide GFM for the PED function could extend to the DCGS elements of all military services that conduct PED within the overall DCGS enterprise, thereby providing unity of command and effort.[15]

Eighteenth Air Force Tanker Airlift Control Center

Like the Air Force's DCGS, the service's air mobility maintains a global responsibility that requires it to execute global force allocation. Multiple common users compete for limited air mobility forces, necessitating priority-based allocation. A fixed air and space operations center, Eighteenth Air Force's TACC serves as the organizational mechanism used to execute this priority; it "plans, coordinates, schedules, tasks, and controls air mobility missions worldwide."[16]

The TACC exercises centralized command of global air mobility forces in order to conduct approved intertheater allocation quickly.[17] Normally, US Transportation Command, rather than a geographic commander, retains the preponderance of these forces. Air and space forces that concurrently support more than one COCOM, such as those involved in air mobility, are best organized under a functional organizational structure.[18] However, a small portion of global air mobility forces are assigned to geographic commanders in support of high-priority, emerging requirements.[19] When a COCOM requires additional forces of this type, the chairman of the Joint Chiefs of Staff may convene a joint transportation board to adjudicate the situation and reallocate resources. The secretary of defense approves all reallocations, and the TACC executes from this approved reallocation.[20]

Examination of the Air Force's DCGS and Eighteenth Air Force's TACC teaches valuable lessons regarding global force allocation and distributed operations. The performance of the WOC and TACC suggests that maintaining a centralized global mission-management entity has value in optimizing LD/HD resources. Priority-based allocation is essential in reconciling competing theater requirements. Dynamic intertheater reallocation demands the empowerment of global mission management with formal tasking authority. Organizing distributed sites along subject-matter-expert focus areas in order to build habitual relationships with supported units further enhances effectiveness. Presenting forces through a mix of functional and geographically based models not only facilitates intertheater reallocation but also provides dedicated capability to theater commanders. A global mission-management entity exercising centralized control is best postured to balance this mix. The GDO concept draws from these lessons as it seeks to optimize the global enterprise executing remotely piloted RSO missions.

Emergence of Global Dynamic Operations

A futuristic concept, GDO seeks to attain a degree of power projection by dynamically allocating RPA aircrews to areas defined by national priority. It does so by exploiting two unique operational characteristics of RSO RPA technology: (1) the ability to allocate RSO RPA aircrews across vast distances in minimal time and (2) the capability to employ RPAs independently of dedicated aircrews.

Concept of Operations

Assuming requisite bandwidth and deployed footprint, current RSO technology enables the "virtual allocation" of RPA aircrews across the globe with unprecedented speed. Unlike traditional force-allocation models that allocate platforms, the GDO concept allocates aircrews—a departure from the usual procedures that allocate remotely piloted RSO aircraft capability per mission and/or combat air patrol.[21] The GDO concept also exploits multiaircraft

control, an existing technology that enables a single ground-control station to control multiple RPAs. In such operations, a single pilot can actively control one RPA while monitoring others.[22]

Multiaircraft control technology, enabled by RSO virtual allocation, permits aircrew allocation in two different configurations: active or monitored mission status. In the former, an RPA sortie employs with a dedicated aircrew, whereas a monitored mission employs with an aircrew that operates two or more RPAs (see figure).[23] This type of unique employment construct forms the foundation of the GDO concept: *dynamic allocation of active and monitored RPA missions*.

Organization and Policy

Organizationally, the GDO concept calls for establishment of a robust global mission-management entity to execute rotational and emergent force allocation of RPA aircrews across COCOMs, based on national priority as defined in the GEF. In the GDO concept, global mission management has formal authority to provide unity of command for joint-force RPA aircrews that would otherwise be employed piecemeal among disparate COCOMs. It is also postured to provide unity of effort for multinational and interagency RPA operations. Therefore, global mission management in a GDO construct seeks high degrees of unified action through the dynamic allocation of active and monitored RPA missions.[24]

The GDO concept advocates significant policy changes, the most notable of which transfers RPA resource authority from the secretary of defense to the GDO global mission manager—a change essential for the success of GDO. Experience with the Air Force's DCGS indicates that global mission management requires formal authority when it executes dynamic, priority-based allocation in a resource-constrained environment. Formal authority also yields the tools to conduct allocation art when solving complex allocation problems.

Policy changes also occur regarding command authorities and relationships. Because the GDO concept views RPA aircrews as a resource that can be assigned, apportioned, and allocated apart from the aircraft, it is both possible and desirable to separate OPCON of the aircrews from that of the aircraft in order to achieve maximum flexibility. In a proposed GDO environment, a functionally oriented, global mission-management entity has OPCON of the preponderance of RPA aircrews, which are considered an attached force to the supported geographic COCOM.[25] When allocated to a geographic COCOM, such aircrews remain under tactical control of the combatant commander for the duration of the tasked mission.[26] The geographic combatant commander has both OPCON and tactical control of RPAs and associated in-theater support resources.[27] However, the GDO concept allows for assignment of a portion of RPA aircrews to a geographic COCOM, as the situation demands. This overall construct is similar to distributed intelligence operations and the use of global air mobility forces that involve organizing and commanding resources along a mix of functional and geographic lines.[28]

Allocation Processes for Rotational Forces

Proposed GDO processes involved in GFM rotational and emergent force allocation are articulated in the form of active and monitored RPA missions. The GDO concept provides predictable RPA capability to combatant commanders by employing a portion of active and monitored RPA missions in a prescribed, rotational force-allocation structure. In accordance with traditional GFM policy, rotational forces are allocated to a combatant commander, typically for a specified period of time. With traditional rotational force allocation of manned platforms, this structure trades flexibility for predictability. However, the active and monitored RPA mission structure provides flexibility *and* predictability because, within a GDO con-

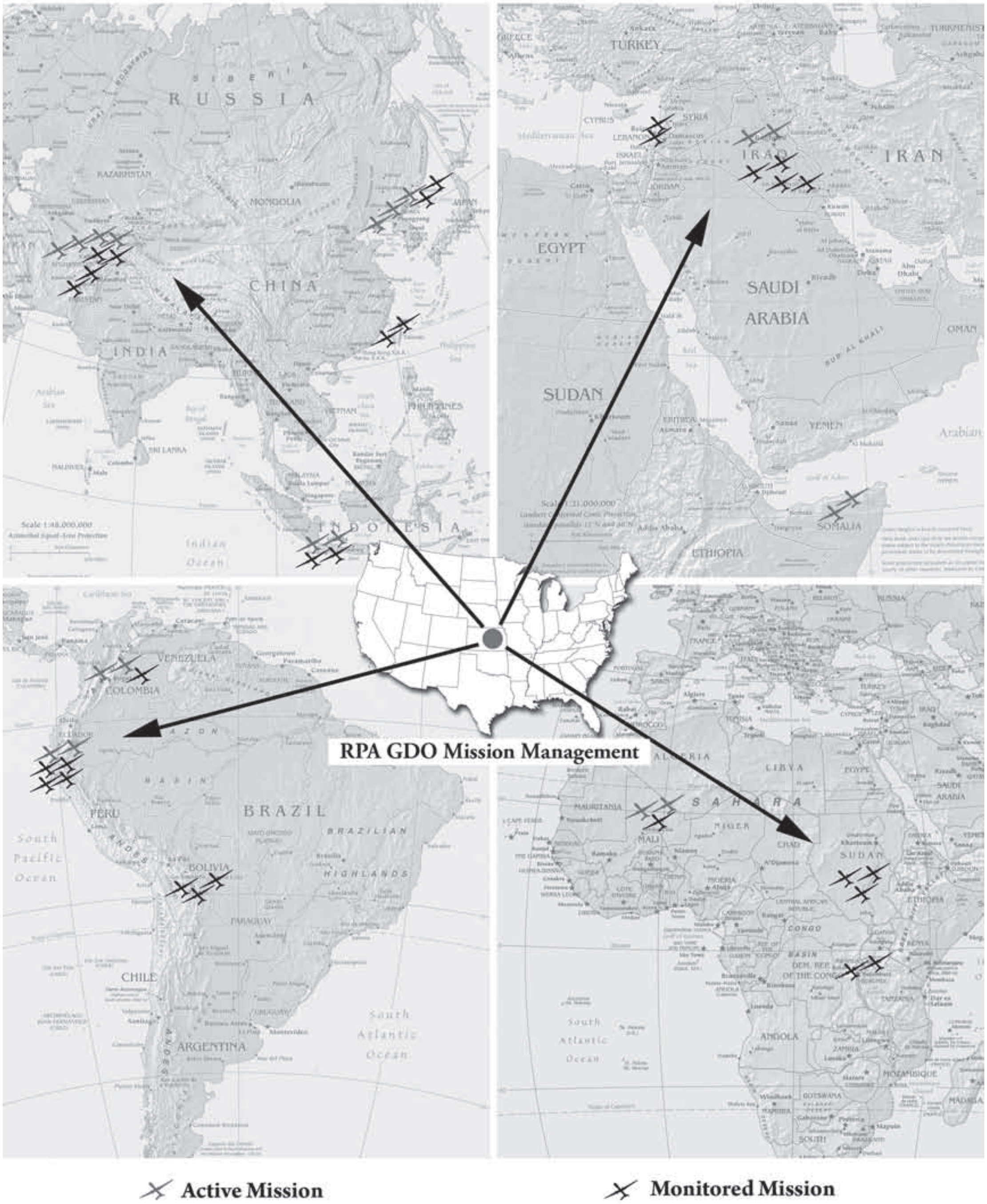

Figure. Global dynamic operations of remotely piloted aircraft systems

struct, RPA aircrew resources can be tailored to specific rotational-force requirements.

The GDO concept provides for the effective and efficient allocation of rotational forces. In a notional GDO example, COCOM X employs 10 RPA aircrews to operate 10 active RPA missions (see table). COCOM Z employs four RPA aircrews to execute 13 RPA missions, based on COCOM requirements. Using the traditional GFM model, COCOM Z would have absorbed 13 RPA aircrews to support 13 RPA missions, even though the requirement could have been satisfied with four RPA aircrews in a monitored mission status. The GDO concept retreats from the one-size-fits-all allocation construct currently employed by GFM and precisely applies LD/HD RPA resources when and where needed. This concept—the essence of "requirements-driven allocation"—illustrates how the military can realize economy of force in terms of RPA aircrews at the strategic level.

Rotational force allocation conducted in a GDO model also offers the opportunity to create a "strategic reserve" of RPA aircrews. After the minimum number of aircrews are allocated to rotational force requirements, five RPA aircrews remain untasked and available for emergent allocation (see table). National decision makers and global mission management may view this complement of aircrews as a strategic reserve available for full-time, flexible employment, based on dynamic, changing national priorities, thus obviating the need to reallocate aircrews from their assigned COCOM tasking. Therefore, national decision makers achieve a degree of flexibility while combatant commanders retain predictability of their rotational resources of RPA aircrews. This allocation model mirrors those in Iraqi Freedom whereby operational-level echelons retain a portion of RPA assets in order to respond to emerging, ad hoc requirements, while tactical echelons receive predictable RPA capability.[29] This model is

Table. Global dynamic operations of remotely piloted aircraft: rotational and emergent force-allocation response to crises

Rotational Force Allocation (Steady State)		
COCOM	Active/Monitored Missions	Minimum no. of aircrews required*
X	10 Active	10
	0 Monitored	
Y	5 Active	6
	4 Monitored	
Z	1 Active	4
	12 Monitored	
Total minimum aircrews required		20

Total RSO RPA enterprise aircrews available	25
Remaining aircrews available for emergent allocation	5

Emergent Force Allocation: Single Crisis		
COCOM	Precrisis Allocation	Crisis Allocation
X	10 Active	Unchanged
	0 Monitored	
Y	5 Active	Unchanged
	4 Monitored	
Z crisis	1 Active	6 Active
	12 Monitored	12 Monitored

Emergent Force Allocation: Multiple Crises		
COCOM	Precrisis Allocation	Crisis Allocation
X crisis	10 Active	15 Active
	0 Monitored	4 Monitored
Y	5 Active	0 missions
	4 Monitored	
Z crisis	1 Active	6 Active
	12 Monitored	12 Monitored

*Aircrew manning for monitored missions is calculated using a multiaircraft control ratio of one aircrew per four RPAs.

also representative of a force tasked in a "general support" role, supporting combatant commanders as a whole but not any particular theater.

The number of strategic reserve resources can be adjusted, based on the level of volatility expected both near term and midterm. A large number of RPA aircrews may be "apportioned" for emergent allocation if crises are expected in multiple COCOMs, thereby necessitating flexible, dynamic, inter-COCOM allocation. However, if the security environment is such that dynamic shifts in resources between COCOMs are not expected, then fewer RPA aircrews can be apportioned for emergent allocation and more committed to rotational force requirements. The ratio of active and monitored missions can also be adjusted, based on the availability of RPA resources and mission requirements. These concepts are similar in function to theater-based air apportionment, which entails adjusting the level of air effort, as articulated by varying airpower missions according to the situation.[30]

Allocation Processes for Emergent Forces

Similar to its effect on rotational force allocation, the GDO concept also revolutionizes emergent force allocation by enabling unprecedented flexibility and responsiveness for dynamic, inter-COCOM allocation in single and multicrisis environments. Emergent force allocation seeks either to allocate RPA aircrews made available as a result of rotational force allocation or to use formal tasking authority to allocate aircrews from one COCOM to another. In terms of the scenario depicted in the table, the five aircrews made available from rotational force allocation are dynamically allocated to COCOM Z. Furthermore, due to multicrisis requirements, the scenario shows how global mission management operating in a GDO construct can reallocate aircrews from COCOM Y to COCOM X, leaving the former with no RPA aircrews outside the theater. This demonstrates the potential beneficial and adverse effects of priority-based allocation.

As exercised in a GDO model, emergent forces are subject to priority-based allocation. RPA aircrews tasked with low-priority targets in a particular COCOM may be allocated to a COCOM that maintains higher-priority targets.[31] On the one hand, this allocation model has the advantage of guarding against theater-scale "penny packeting" of RPA aircrews, whereby a lower-priority COCOM may seek to husband its allocated RPA resources in response to competing, higher-priority COCOMs. On the other hand, it requires a high level of risk mitigation. In situations calling for reallocation of resources from a COCOM, global mission management must work aggressively to leverage the global enterprise in order to mitigate the loss of resources while maximizing potential opportunities.

When conducting GDO-based emergent allocation, global mission management executes the role of force provider, not force employer, and adheres to the tenet of centralized control, decentralized execution.[32] In a complex operating environment, lower-level commanders know best how to employ RPA forces in a tactical context. Therefore, in a GDO concept, the global mission manager provides RPA aircrews, but theater commanders employ them in an active/monitored mission configuration tailored to their operations. Throughout the spectrum of operations, mission management must view itself as a supporting entity, responsible for the success of the supported theater commander.

In order to increase responsiveness, transparency, and access for combatant commanders, the GDO model procedurally allows COCOMs to submit time-sensitive RFFs directly to global mission management. With its delegated authority from the secretary of defense, global mission management is postured to make responsive allocation decisions, based on GEF priorities. This effectively moves execution operations out of national-level staffing organizations and into the hands of an operationally oriented organization.

Challenges

Even though the GDO concept promises great advances in the allocation of RPA aircrews, significant challenges threaten to limit its effectiveness, the foremost of which involves COCOM "ownership" of those aircrews. Geographic COCOMs will likely want to retain OPCON of RPA aircrews rather than cede the preponderance of such control to a functional command. To reconcile this challenge, the GDO concept must show that support can be more beneficial than ownership. Similar to operations involving distributed intelligence and global air mobility, GDO leverages the entire force rather than a smaller, theater-based force. Such global sourcing and joint interdependence provide geographic commanders greater capability. Ultimately, GDO performance will become the key in building trust with the geographic COCOMs.

The GDO concept's ability to realize power projection depends upon the pre-positioning of RPA resources in/near respective theaters of operation, a scenario that poses two challenges: access and resource availability. Launch and recovery elements for remotely piloted RSO aircraft must be located in proximity to the target area. Even as the capabilities of these aircraft increase in terms of speed, range, and duration, access of the launch and recovery elements will remain a critical employment consideration. Moreover, the elements themselves (remotely piloted platforms, aircrews, communications equipment, and maintenance facilities) are finite and must be increased in proportion to the level of power projection desired. The GDO concept assumes the availability of these resources.

Complexity induced by the expanding global RPA enterprise will prove problematic for global mission management. The proliferation of RPA platforms and capabilities, sensor capabilities, networked C2, and joint service and multinational partners adds capability to the enterprise but also complicates mission management.[33] Horizontal integration between interdependent entities, such as the RPA and DCGS enterprises, must limit seams as both expand in size and scope. Vertical integration among strategic, operational, and tactical echelons will blur as linkages become more diffuse.

RPA aircrew training, theater familiarization, and tactical integration represent another hurdle. Each theater maintains its own unique operating environment in terms of organization, policy, procedures, and operating culture. RPA aircrews must have the mental agility to flex between environments, maintaining proficiency in each theater. Furthermore, those aircrews tasked with supporting multiple theaters of operation in different COCOMs must contend with the need to develop habitual relationships with supported units.

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Recommendations

The GDO concept requires an organizational structure that provides unity of command and effort, independent of service and COCOM bias. A functional joint task force's organizational structure, empowered with formal authority to make timely reallocation decisions between COCOMs, satisfies these requirements. Establishing and assigning a GDO joint task force under US Strategic Command (STRATCOM), which commands eight other functionally based, globally oriented missions that conduct daily planning and execution for their respective primary mission areas, would offer the same sort of orientation needed for launching and sustaining the proposed GDO mission.[34]

As a global distributed operation networked among multiple federated partners, the GDO concept facilitates robust horizontal, lateral, and cross-department information flows. In this environment, command and sensors tend to decouple from traditional command authorities.[35] This operational environment requires fluid, dynamic, and adaptable command authorities and relationships. The military must develop and implement doctrine, policies, and procedures in order to realize these ends and foster a further degree of organizational trust among the services.

Conclusion

> *Strategy decides the time when, the place where, and the forces with which the engagement is to be fought, and through this threefold activity exerts considerable influence on its outcome.*
>
> —Carl von Clausewitz

According to Clausewitz, strategy should determine the timing and placement of forces. The GDO concept offers national decision makers a mechanism to dynamically translate changing strategic priorities into globally postured RPA forces for combatant commanders. In essence, this concept gives them employment options (which the current GFM construct fails to provide) when formulating strategy, as they seek to reconcile ends, ways, and means. Traditional GFM organization, policy, and procedures are not designed to satisfy this requirement at a tempo generated by the dynamic allocation of RPA aircrews. The GDO concept proposes bold changes to traditional force allocation in order to bridge this gap. As noted by the *Quadrennial Defense Review Report* (2006), "The principles of transparency, constructive competition to encourage innovation, agility and adaptability, collaboration and partnership should guide the formulation of new strategic processes and organizational structures."[36] The GDO concept is guided by this spirit of innovation.

Even though this concept seeks bold change, it remains pragmatic—grounded in the shared tenets of air and space power.[37] The allocation of RPA aircrews is centrally controlled and decentrally executed, using flexible and versatile methods. Centralized, global mission management helps to ensure the concentration of purpose, priority, and balance necessary to maximize LD/HD RPA resources. A mix of allocation art and science produces synergistic effects in order to attain persistence in the forms of surveillance and global strike.

Regardless of how the GDO concept contributes to the global mission management of RPAs, future efforts must continue to seek optimum solutions in areas of dynamic inter-COCOM allocation, adaptive command relationships, and net-centric global mission management. The *National Defense Strategy* of 2008 reminds us that "implementation of any strategy is predicated on developing, maintaining and, where possible, expanding the means required to execute its objectives within budget constraints. . . . The challenges before us will require resourcefulness and an integrated approach that wisely balances risks and assets."[38] ✪

Notes

1. "Split operations are a type of distributed operations. The term describes those distributed operations conducted by a single C2 entity that is separated between two or more geographic locations. A single commander must have oversight of all aspects of a split C2 operation." Air Force Doctrine Document (AFDD) 2-8, *Command and Control*, 1 June 2007, 47, http://www.dtic.mil/doctrine/jel/service_pubs/afdd2_8.pdf (accessed 21 September 2009). "Distributed operations occur when independent or interdependent nodes or locations participate in the operational planning and/or operational decision-making process to accomplish goals/missions for engaged commanders." Ibid., 46. "The system['s] . . . components include the necessary equipment, data communication links, and personnel to control and employ a remotely piloted aircraft. The remotely piloted aircraft is composed of six components: the aircraft, payloads, data communication links, ground control stations, ground support equipment, and ground operators." Joint Unmanned Aircraft Systems Center of Excellence, *Joint Concept of Operations for Unmanned Aircraft Systems*, 2d ed. (Creech AFB, NV: Joint Unmanned Aircraft Systems Center of Excellence, November 2008), GL-11.

2. To date, theater-based, virtual RSO RPA allocation has been conducted only in CENTCOM due to the fact that the preponderance of medium-altitude RSO RPAs has supported Enduring Freedom and Iraqi Freedom since 2003.

3. Situations that may precipitate a reallocation of RSO RPAs include, but are not limited to, changing priorities, weather implications, and communications availability.

4. Joint Publication (JP) 3-0, *Joint Operations*, 17 September 2006 (change 1, 13 February 2008), I-2, http://www.dtic.mil/doctrine/jel/new_pubs/jp3_0.pdf (accessed 14 September 2009).

5. Global strike is "responsive joint operations that strike enemy high value / payoff targets, as an integral part of joint force operations conducted to gain and maintain battlespace access, achieve other desired effects and set conditions for follow-on decisive operations to achieve strategic and operational objectives." Department of Defense, *Global Strike Joint Integrating Concept*, version 1.0 (Washington, DC: Department of Defense, 10 January 2005), 2-1, http://www.dtic.mil/futurejointwarfare/jic.htm. Persistent surveillance is "a collection strategy that emphasizes the ability of some collection systems to linger on demand in an area to detect, locate, characterize, identify, track, target, and possibly provide battle damage assessment and retargeting in near or real-time. Persistent surveillance facilitates the prediction of an adversary's behavior and the formulation and execution of preemptive activities to deter or forestall anticipated adversary courses of action." JP 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 12 April 2001 (as amended through 19 August 2009), 416. Power projection is "the ability of a nation to apply all or some of its elements of national power—political, economic, informational, or military—to rapidly and effectively deploy and sustain forces in and from multiple dispersed locations to respond to crises, to contribute to deterrence, and to enhance regional stability." JP 1-02, *Department of Defense Dictionary*, 426.

6. Office of the Secretary of Defense, *Quadrennial Defense Review Report* (Washington, DC: Office of the Secretary of Defense, 6 February 2006), v–vii, http://www.defenselink.mil/qdr/report/Report20060203.pdf (accessed 15 September 2009).

7. Department of Defense, *Force Management Joint Functional Concept*, version 1.0 (Washington, DC: Department of Defense, 2 June 2005), 1, http://www.dtic.mil/futurejointwarfare/concepts/fm_jfc_v1.doc.

8. This article borrows the term *Global Dynamic Operations* from Col Allan W. Howey's paper of the same name (Maxwell AFB, AL: Airpower Research Institute, College of Aerospace Doctrine, Research and Education, Air University, April 2001), http://handle.dtic.mil/100.2/ADA391117. Colonel Howey's concept envisions a centrally controlled or coordinated air and space campaign that employs globally capable low density / high demand (LD/HD) air and space assets in a global, multitheater environment. This article, however, uses GDO differently, envisioning global, dynamic reallocation of RPA resources.

9. US Air Force, "Theater ISR CONOPS" (Washington, DC: Department of the Air Force, 4 January 2008), 2.

10. AFDD 2-9, *Intelligence, Surveillance, and Reconnaissance Operations*, 17 July 2007, 33, http://www.dtic.mil/doctrine/jel/service_pubs/afdd2_9.pdf (accessed 21 September 2009).

11. Located at Langley AFB, VA, the WOC provides global mission management for the US Air Force DCGS enterprise, including active duty and Air National Guard DCGS units.

12. The WOC reallocated 953 of 4,696 sorties in 2007.

13. Operational control is "the authority to perform those functions of command over subordinate

forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission." JP 1-02, *Department of Defense Dictionary*, 398.

14. Each Air Force distributed ground system site is under the operational control of its respective intelligence group, subordinate to a numbered air force, which directly supports a COCOM's Air Force component commander at the operational and tactical levels.

15. Col Kimberly Sievers, division chief, Intelligence, Surveillance, and Reconnaissance Global Force Management, USSTRATCOM/JFCC-ISR, 2006–2009, to the author, e-mail, 8 April 2009.

16. AFDD 2-6, *Air Mobility Operations*, 1 March 2006, 8, http://www.dtic.mil/doctrine/jel/service_pubs/afdd2_6.pdf (accessed 21 September 2009).

17. Ibid., 13–15.

18. AFDD 2, *Operations and Organization*, 3 April 2007, 45–46, http://www.dtic.mil/doctrine/jel/service_pubs/afdd2.pdf (accessed 21 September 2009).

19. AFDD 2-6, *Air Mobility Operations*, 11–12.

20. Ibid., 72.

21. In the context of RPA operations, a combat air patrol describes an RPA mission sortie. Current force management communicates RSO RPA capability in terms of the number of such patrols assigned to a theater. That is, COCOM X has 10 MQ-1 Predator combat air patrols assigned, meaning that it may execute 10 Predator missions for the stated period of time.

22. Joint Unmanned Aircraft Systems Center of Excellence, *Joint Concept of Operations*, III-6. The operational trade-off in a multiaircraft-control construct is that monitored missions may be less tactically responsive than active missions. The advantage is that such a construct enables employment of a larger number of platforms per RPA aircrew than would be possible in a 1:1 manning model.

23. The terms *active mission* and *monitored mission* were developed and first used during initial multiaircraft-control operations conducted at Nellis AFB, NV, in 2006.

24. "The term 'unified action' in military usage is a broad term referring to the synchronization, coordination, and/or integration of the activities of governmental and nongovernmental entities with military operations to achieve unity of effort." JP 1, *Doctrine for the Armed Forces of the United States*, 2 May 2007 (incorporating change 1, 20 March 2009), xii, http://www.dtic.mil/doctrine/jel/new_pubs/jp1.pdf (accessed 21 September 2009).

25. Ibid., IV-3. Attached forces are those that are temporarily transferred to a joint force.

26. Tactical control is "command authority over assigned or attached forces or commands, or military capability or forces made available for tasking, that is limited to the detailed direction and control of movements or maneuvers within the operational area necessary to accomplish missions or tasks assigned." JP 1-02, *Department of Defense Dictionary*, 537.

27. In-theater resources entail the launch and recovery element, which includes the aircrews, aircraft, maintenance, and communications resources.

28. AFDD 2, *Operations and Organization*, 57.

29. Raymond T. Odierno, Nichoel E. Brooks, and Francesco P. Mastracchio, "ISR Evolution in the Iraqi Theater," *Joint Force Quarterly*, no. 50 (3d quarter 2008): 51–55, http://www.ndu.edu/inss/Press/jfq_pages/editions/i50/14.pdf (accessed 21 September 2009). Partial apportionment shows a balance of ISR assets—allocation not entirely based on either organic control or centralized priority. In partial apportionment, a portion of RPA capability is retained by a higher echelon in order to respond to emerging requirements without tapping into assets allocated to lower echelons.

30. Apportionment (air) is "the determination and assignment of the total expected effort by percentage and/or by priority that should be devoted to the various air operations for a given period of time." JP 1-02, *Department of Defense Dictionary*, 40.

31. "Prioritization—Because operational needs for intelligence often exceed intelligence capabilities, prioritization of collection and analysis efforts and . . . ISR resource allocation are vital aspects of intelligence planning. Prioritization offers a mechanism for addressing requirements and effectively managing risk by identifying the most important tasks and applying available resources against those tasks." JP 2-0, *Joint Intelligence*, 22 June 2007, xiv, http://www.dtic.mil/doctrine/jel/new_pubs/jp2_0.pdf (accessed 21 September 2009).

32. "Centralized control of air and space power is the planning, direction, prioritization, synchronization, integration, and deconfliction of air and space capabilities to achieve the objectives of the joint force commander. . . . Centralized control maximizes the flexibility and effectiveness of air and space power; however, it must not become a recipe for micromanagement, stifling the initiative subordinates need to deal with combat's inevitable uncertainties. Decentralized execution of air and space power is the delegation of execution authority to responsible and capable lower-level commanders to achieve effective span of control and to foster disciplined initiative, situational responsiveness, and tactical flexibility. It allows subordinates to exploit

opportunities in rapidly changing, fluid situations." AFDD 1, *Air Force Basic Doctrine*, 17 November 2003, 28, http://www.dtic.mil/doctrine/jel/service_pubs/afdd1.pdf (accessed 21 September 2009).

33. "The future direction of UAS [unmanned aircraft system] C2 is to move away from point-to-point data links to network data links to facilitate more collaborative and 'common use' of UAS. NATO defines five different Levels of Interoperability (LOI) that identify the flexibility in control for all active UAS. The most robust LOI, Level 5, enables operators to pass full control of the aircraft and/or payload from one operator to another. This capability permits users from different military Services and government agencies to operate other Service agency UA platforms within a given UAS constellation." Joint Unmanned Aircraft Systems Center of Excellence, *Joint Concept of Operations*, III-6, 7.

34. STRATCOM's functional components include JFCC-Global Strike (JFCC-GS), JFCC-Space (JFCC-SPACE), Joint Task Force-Global Network Operations (JTF-GNO), JFCC-Network Warfare (JFCC-NW), JFCC-Integrated Missile Defense (JFCC-IMD), JFCC-Intelligence, Surveillance, and Reconnaissance (JFCC-ISR), Joint Information Operations Warfare Command (JIOWC), and USSTRATCOM Center for Combating Weapons of Mass Destruction (SCC-WMD). "Functional Components," United States Strategic Command, http://www.stratcom.mil/functional_components/ (accessed 17 April 2009).

35. David S. Alberts, John J. Garstka, and Frederick P. Stein, *Network Centric Warfare: Developing and Leveraging Information Superiority*, 2d ed. rev., CCRP Publication Series (Washington, DC: DOD C4ISR Cooperative Research Program, February 2000), 120, http://www.dodccrp.org/events/12th_ICCRTS/CD/library/html/pdf/Alberts_NCW.pdf.

36. Office of the Secretary of Defense, *Quadrennial Defense Review Report*, 1.

37. The tenets of air and space power include centralized control and decentralized execution, flexibility and versatility, synergistic effects, persistence, concentration of purpose, priority, and balance. AFDD 1, *Air Force Basic Doctrine*, 27–33.

38. Department of Defense, *National Defense Strategy* (Washington, DC: Department of Defense, June 2008), 18, http://www.defenselink.mil/pubs/2008NationalDefenseStrategy.pdf (accessed 17 April 2009).

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